BPM-1

Bipolar Module

User's Manual

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NOTICE

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BIPOLAR MODULE

1.1 DESCRIPTION

The BPM-1 PROM Adapter is a plug-in module for the PROMPRO-XP/8X Programmer. The adapter mounts on the SKT2 40-pin ZIF socket. When using the BPM-1 Adaptor, care must be taken to insure that the adapter is mounted straight and flush against both the main unit and the ZIF socket. This is an important step since poor adapter mounting can result in unpredictable results. Also, ground the adapter to the main unit through the supplied ground wire. This ground wire would protect ground integrity in the event the adapter came loose.

1.2 PROM PROGRAMMING

The BPM-1/programmer combination programs a variety of fusible link PROMs from several different manufacturers (refer to Table 1. The ZIF socket accomodates most PROM packages from 16-pin, with .3 centers to 28-pin, with .6 centers. PROMs are inserted in the socket with the back side justified to the rear of the socket.

Using the PROM adapter the following commands are also applicable: Device Select, Load, Program, Verify, and Blank Check. Also, all RAM editing and data transfer commands still apply. Refer to the PROMPRO-XP/8X Manual for details.

The device select procedure differs from the main unit (EPROMs) device selection. When the device select key is activated, the PROMPRO-XP/8X returns with a four digit device code. To change, simply type a new four digit device code. A four digit device code is required because there are a very large number of different PROMs on the market.

----- CAUTION -----

Never try to program or read a PROM that is not listed in the Device Dictionary.

1.3 BIPOLAR PROM PROGRAMMING EXAMPLE

Following is a step-by-step description, using the PROMPRO-XP/8X/BPM-1 combination for programming one of the more complicated bipolar PROMs. The PROM used in this description was selected because of its' special initialized feature. This allows the user to become more familiar with all of the functions available with the adapter module.

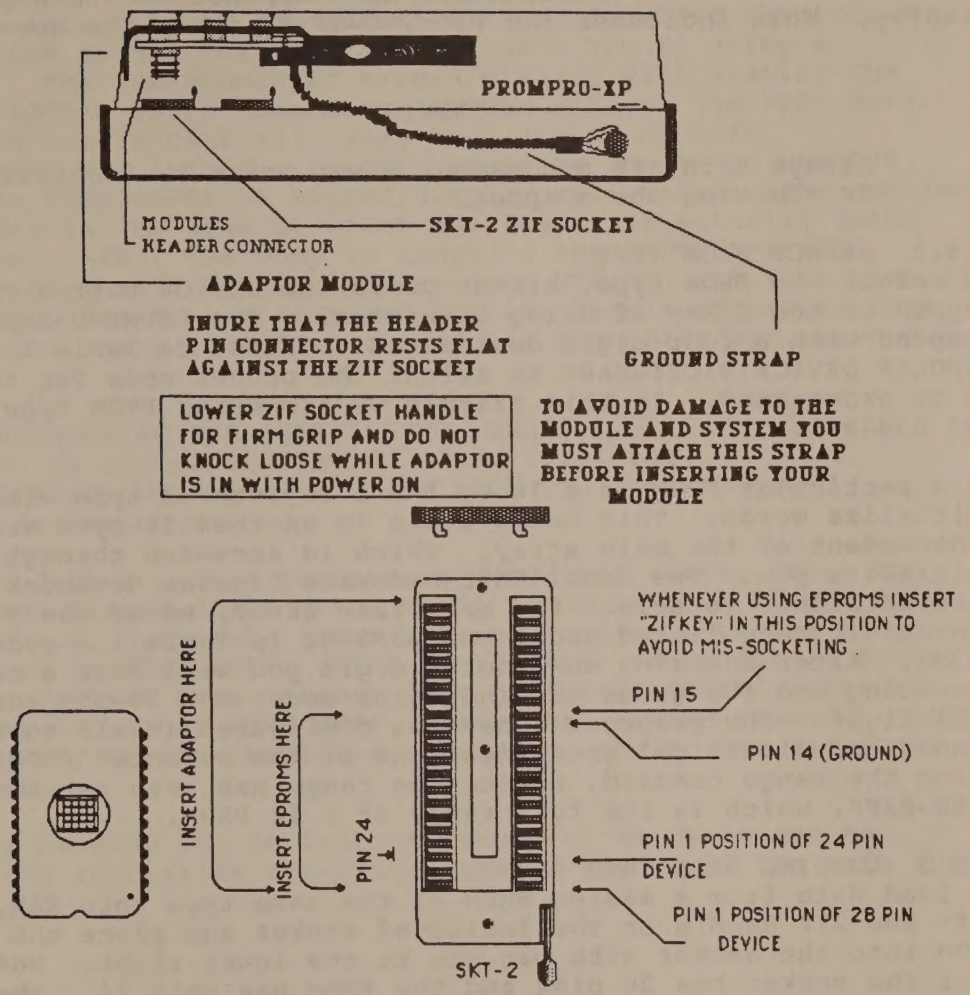
Most of the PROMPRO-XP/8X functions remain the same as described in the PROMPRO-XP/8X User's Manual. Below is a list of the functions that may change when the BPM-1 adaptor module is used.

USER FUNCTION	INTERNAL FUNCTIONS
1. DEVICE SELECT	1. POWER UP
2. LOAD	2. INITIALIZATION
3. PROGRAM	3. RAM ACCESS
4. VERIFY	4. SKT1/2 ACTIVITY
5. BLANK CHECK	

1.4 INSTALLATION

NOTE: Refer to Figure 1.

1. Turn off programmer power.
2. Remove the CNF plug (small plastic part) from the front panel.
3. If installed, remove the ZIF-LOCK from the programmer ZIF socket SKT2 (This is the small plastic insert supplied to prevent mis-socketing 24-pin EPROMs in the 28-pin ZIF socket).
4. Attach the adaptor ground strap to the ground post on the front of the programmer.
5. Lift the ZIF socket handle to the up (release) position.
6. Install the BPM-1 adaptor flush on ZIF socket SKT2.
7. Lower the ZIF handle to a secure electrical connection.
8. Turn on programmer power.



CAUTION

WHEN EVER USING ADAPTOR FOR PALS OR BIPOLAR PROMS ATTACH GROUND CORD TO XP CHASSI FIRST.

Figure 1. BPM-1 Installation

1.5 OPERATION

First, install the BPM-1 Adaptor as described in Paragraph 1.2 INSTALLATION. After installation an * appears on the keypad display. This indicates the PROMPRO-XP/8X is in the command mode.

----- CAUTION -----

Always turn off programmer power prior to installing or removing the adaptor.

1.5.1 SELECT PROM TYPE

To select the PROM type, either press the DEVICE button on the keypad or the S key if using a terminal. The PROMPRO-XP/8X will respond with a four digit device code. Refer to Table 1. BIPOLAR DEVICE DICTIONARY to select the proper code for the PROM to be programmed. In this example we are using PROM type MMI 63RS881.

This particular PROM is a 1k by 8 bit registered type with 16 initialize words. This means there is another 16-byte array, independent of the main array, which is accessed through the initialize pin. See Monolithic Memories Bipolar Databook for more details. To select the main fuse array, enter the first four digit code listed under MMI 63RS881 in Table 1 (code AA39). After entering the fourth digit you will hear a relay operating and the green LED indicator under the 28-pin socket will light. The programmer has now configured itself to the pinout and electrical specifications of the selected PROM. If using the range command, notice the range has been set to 0000-03FF, which is the full range of a 1k PROM.

1.5.2 LOADING DATA INTO RAM

To load data from a master PROM of the same type into RAM, first lift the ZIF handle on the indicated socket and place the master PROM into the socket with pin one to the lower right. Notice that the socket has 28 pins and the PROM has only 24. When this occurs, use the ZIF-Lock provided with the PROMPRO-XP/8X to prevent mis-socketing. If the ZIF-Lock is not available, insert the PROM to the rear of the ZIF socket. Once the PROM is inserted, press the ZIF handle down to lock the PROM firmly in place

To load the data from the PROM into the programmer, press either the LOAD button on the keypad or the L key if using a terminal. The PROMPRO-XP/8X keypad/display will display the message LOADING while the data is being transferred to the programmers' internal RAM buffer.

1.5.3 COPY RAM TO PROM

To program the data from the programmers' internal RAM into the PROM, remove the master PROM and replace it with a blank PROM in the same socket as above. You may use the BLNKCK command to check the integrity of the inserted PROM. To start the program cycle, press either the PROG key or the P key if using a terminal. The PROMPRO-XP/8X keypad/display will display the message PROGRAM while comparing the RAM data to the PROM data. This is to ensure that all fuses that are to be left unprogrammed are intact. If this cycle is completed without error, the PROMPRO-XP/8X keypad/display will display the message COPY. This is the time at which the fuses are actually being programmed. After the copy is complete the PROMPRO-XP/8X keypad/display will display the message VERIFY. At this time it checks every bit at Vcc high and Vcc low levels to assure that all low bits are below .7 volts and all high bits are above 2.5 volts.

1.5.4 PROGRAMMING THE INITIALIZED WORDS

NOTE: To access the second array (i.e. the initialize words) within the PROM you must change the device code.

Using the device select command as described above, enter the second code listed under MMI 63RS881 (code A4B9). If you check the range now, using the range command, notice that the range has changed to 0000-000F, which is the full range for 16 bytes. Enter the desired data pattern into the programmers' internal RAM buffer locations 0000-000F. Using the BLNKCK command, check the integrity of the initialize array to ensure that all fuses are intact.

Press the PROGRAM key to initiate the program cycle and to program the initialize array the same as you would the main fuse array.

1.6 COMMAND MESSAGES

LOADING — Load the contents of the PROM (within the range selected) into the RAM at the address indicated by the page offset selected.

TESTING — The message TESTING is initiated by the Blank Check command. It indicates that the programmer is testing the PROM to ensure that all links are intact. If the programmer detects a programmed link, an error message will be displayed (see

BLANK — NB aaaa) indicating the address of the programmed link.

BLANK — If the test is successful the message BLANK will be displayed.

VERIFY — Compares the RAM data to the PROM data at VCC low and high levels. It also tests each bit to that all low bits are below .7 volts and that all high bits are above 2.5 volts. The message VERIFY is displayed when the the Verify command is issued or automatically after the programming sequence is complete. This function may be used to detect marginally programmed devices.

KEYPAD OPERATION — If any bits fail to verify the message FAILaaaa will be displayed on the keypad/display (where "aaaa" is the address where the failed bit was detected). Press the NEXT key to continue verifying and display the next failed location.

TERMINAL OPERATION — If a terminal was used to initiate a command, a list of up to 12 failed locations will be displayed. Press the space bar to continue listing failed locations or press the return key to quit.

PROGRAM — When the Program command is issued, the message is displayed while the programmer is testing the RAM/PROM for any illegal bits (see IB aaaa). Upon completion of the bit test the copy cycle is initiated. This is indicated by displaying the message COPYING.

COPYING

The PROM fuse links are actually programmed during the copy cycle. If an error occurs during this time the PF error will be displayed (see PF aaaa). Upon successful completion of the copy cycle, the VERIFY cycle will be initiated.

DVC-nnnn

The Device Select command allows the user to enter the device code for the desired PROM. The device codes are listed in Table 1, Bipolar Device Select Dictionary.

After the device code is entered, one of the green LED indicators on the BPM-1 Module will light to indicate the proper ZIF socket to use for the device type selected.

To cancel the Device Select command at any time before entering all four digits, press either the EXIT key if using the key pad or the RETURN key if using a terminal.

Some registered PROMs have a second four digit code listed. This code is used to program the Initialize or Clear words described in the manufacturers' specifications. To program the Initialize words, enter the second code listed (e.g., MMI 63RS881 enter A4B9) in Table 1. Device Select Dictionary. Then enter the desired data pattern into memory as if programming the standard PROM array.

NOTES: All commands are range oriented (see Range command)

A socket test is executed before all commands.

Any command initiated by the key pad may be cancelled by pressing the EXIT key.

1.7 ERROR MESSAGES

NOTE: If an error occurs the message will remain on the key pad display, press the exit key to return to the prompt.

OVC MOD	Indicates that an over current condition occurred on the Bipolar Module during power up or reset. When this over current condition is detected by the PROMPRO-XP/8X programmer, power to the module is immediately turned off and the OVC MOD error message is displayed. If this error occurs, turn the power switch off and check the integrity of the SKT-2 ZIF socket connection to the Bipolar Module.
BUSERR	This error message may occur upon power-up or whenever the reset button is pressed. BUSERR indicates something is wrong with the Bipolar Module internal bus. If this error occurs, turn the power switch off and check the connector (located on the bottom of the Bipolar Module) for proper installation or bent/broken pins.
MSKTØØØØ	Indicates that the PROM may be inserted improperly in the module ZIF socket. Check the PROM for proper orientation in the ZIF socket.
NB aaaa	Indicates a non-blank condition. This message is displayed when the Blank Check command is issued. The "aaaa" is the four digit hex address where the first non-blank bit was detected

PF aaaa

Indicates a Program Failure when the programmer internal circuitry is unable to blow the fuse link at the address "aaaa". The particular bit that failed to program can be found by comparing the RAM data to the PROM data at the failed address.

NOTE: No further attempt should be made to programm that bit.

NOTE: aaaa represents the four digit hex address selected at the time the error occurred.

IB aaaa

Indicates that the RAM contains an Illegal Bit that is already programmed in the PROM and is to remain unprogrammed. The address of the illegal bit is indicated by the "aaaa" in the error message.

OVC aaaa

Indicates an Over Current condition occurred while trying to program a bit at the hex address "aaaa". If this error occurs, check the selected device code and make sure the PROM is inserted in the proper ZIF socket.

NOTE: aaaa represents the four digit hex address selected at the time the error occurred.

TABLE 1. BIPOLAR DEVICE SELECT DICTIONARY
(for auto configurator)

TI 14/18 SERIES

PROM TYPE	SIZE	DEVICE CODE
TBP18S030	32 x 8	0500 ----
TBP18S030	32 x 8	0500 ----
TBP18SA030	32 x 8	0500 ----
TBP14S10	256 x 4	1808 ----
TBP14SA10	256 x 4	1808 ----
TBP18S22	256 x 8	0828 ----
TBP18SA22	256 x 8	0828 ----
TBP18S42	512 x 8	0929 ----
TBP18SA42	512 x 8	0929 ----
TBP18S46	512 x 8	0931 ----
TBP18SA46	512 x 8	0931 ----

TI 24/28 SERIES

TBP24S10	256 x 4	3808 ----
TBP24SA10	256 x 4	3808 ----
TBP28L22	256 x 8	2828 ----
TBP28L42	512 x 8	2929 ----
TBP28P42	512 x 8	2929 ----
TBP28S42	512 x 8	2929 ----
TBP28SA42	512 x 8	2929 ----
TBP24S41	1K x 4	3A10 ----
TBP24SA41	1K x 4	3A10 ----
TBP24S81	2K x 4	3B18 ----
TBP24SA81	2K x 4	3B18 ----

TI 24/28 SERIES cont'd

PROM TYPE	SIZE	DEVICE	CODE
TBP28L45	512 x 8	2931	----
TBP28P45	512 x 8	2931	----
TBP28R45	512 x 8	293A	----
TBP28S45	512 x 8	2931	----
TBP28L86	1K x 8	2A31	----
TBP28S86	1K x 8	2A31	----
TBP28SA86	1K x 8	2A31	----
TBP28S2708	1K x 8	2A30	----
TBP28L85	1K x 8	2A31	----
TBP28P85	1K x 8	2A33	----
TBP28R85	1K x 8	2A3A	----
TBP28S85	1K x 8	2A31	----
TBP28L166	2K x 8	2B30	----
TBP28P166	2K x 8	2B30	----
TBP28R166	2K x 8	2B3B	----
TBP28S166	2K x 8	2B30	----

SIGNETICS GENERIC I SERIES

PROM TYPE	SIZE	DEVICE	CODE
82S23	32 x 8	4500	----
82S23A	32 x 8	4500	----
82S123	32 x 8	4500	----
82S123A	32 x 8	4500	----
82S126	256 x 4	5808	----
82S126A	256 x 4	5808	----
82S129	256 x 4	5808	----
82S129A	256 x 4	5808	----
82S130	512 x 4	5909	----
82S130A	512 x 4	5909	----
82S131	512 x 4	5909	----
82S131A	512 x 4	5909	----
82LS135	256 x 8	4828	----
82S135	256 x 8	4828	----
82S137	1K x 4	5A10	----
82HS137	1K x 4	5A10	----
82S137A	1K x 4	5A10	----
82HS137A	1K x 4	5A10	----
82S2137B	1K x 4	5A10	----
82S140	512 x 8	4931	----
82S141	512 x 8	4931	----
82S147	512 x 8	4929	----
82HS147	512 x 8	4929	----
82S147A	512 x 8	4929	----

SIGNETICS GENERIC I SERIES cont'd

PROM TYPE	SIZE	DEVICE	CODE
82LS180A	1K x 8	4A31	----
82LS180B	1K x 8	4A31	----
82S180	1K x 8	4A31	----
82HS181	1K x 8	4A31	----
82HS181A	1K x 8	4A31	----
82LS181	1K x 8	4A31	----
82LS181A	1k X 8	4A31	----
82LS181B	1K x 8	4A31	----
82S181	1K x 8	4A31	----
82S181A	1K x 8	4A31	----
82S181B	1K x 8	4A31	----
82S183	1K x 8	4A3A	----
82HS185	2K x 4	5B12	----
82HS185A	2K x 4	5B12	----
82S185	2K x 4	5B12	----
82S185A	2K x 4	5B12	----
82S185B	2K x 4	5B12	----
82S2708	1K x 8	4A30	----
82HS191	2K x 8	4B30	----
82S191	2K x 8	4B30	----
82S191A	2K x 8	4B30	----
82S191B	2K x 8	4B30	----
82S321	4K x 8	4C30	----

SIGNETICS GENERIC II SERIES

PROM TYPE	SIZE	DEVICE	CODE
82HS195	4K x 4	7C20	----
82HS321	4K x 8	6C30	----
82HS641	8K x 8	6D30	----

HARRIS NiCr PROMS

HM7602	32 x 8	8500	----
HM7603	32 x 8	8500	----
HM7610	256 x 4	9808	----
HM7610A	256 x 4	9808	----
HM7610B	256 x 4	9808	----
HM7611	256 x 4	9808	----
HM7611A	256 x 4	9808	----
HM7611B	256 x 4	9808	----
HM7620	512 x 4	9909	----
HM7620A	512 x 4	9909	----
HM7620B	512 x 4	9909	----
HM7621	512 x 4	9909	----
HM7621A	512 x 4	9909	----
HM7621B	512 x 4	9909	----
HM7640	512 x 8	8931	----
HM7640A	512 x 8	8931	----
HM7641	512 x 8	8931	----
HM7641A	512 x 8	8931	----
HM7642	1K x 4	9A10	----

HARRIS NiCr PROMS

PROM TYPE	SIZE	DEVICE	CODE
HM7642A	1K x 4	9A1Ø	----
HM7642B	1K x 4	9A1Ø	----
HM7643	1K x 4	9A1Ø	----
HM7643A	1K x 4	9A1Ø	----
HM7649	512 x 8	8929	----
HM7649A	512 x 8	8929	----
HM7681	1K x 8	8A31	----
HM7681A	1K x 8	8A31	----
HM7685	2K x 4	9B12	----
HM7685A	2K x 4	9B12	----
HM76161	2K x 8	8B3Ø	----
HM76161A	2K x 8	8B3Ø	----
HM76161B	2K x 8	8B3Ø	----
HM76165	4K x 4	9C2Ø	----
HM76321	4K x 8	8C3Ø	----
HM76641	8K x 8	8D3Ø	----
HM76641A	8K x 8	8D3Ø	----

HARRIS CMOS PROMS

HM6616	2K x 8	EB7B	----

MMI Ti-W SERIES PROM

PROM TYPE	SIZE	DEVICE	CODE
63S080	32 x 8	A500	----
63S081	32 x 8	A500	----
63S081A	32 x 8	A500	----
63S140	256 x 4	B808	----
63S141	256 x 4	B808	----
63S240	512 x 4	B909	----
63S241	512 x 4	B909	----
63RA441	1K x 4	BA11	----
63S441	1K x 4	BA10	----
63S441A	1K x 4	BA10	----
63S841	2K x 4	BB12	----
63S841A	2K x 4	BB12	----
63RS881	1K x 8	AA39	A4B9
63RS881A	1K x 8	AA39	A4B9
63S1641	4K x 4	BC20	----
63S1641A	4K x 4	BC20	----
63S1681	2K x 8	AB30	----
63S1681A	2K x 8	AB30	----
63S3281	4K x 8	AC30	----
63S281A	256 x 8	AC28	----
63S3281A	4K x 8	AC30	----

NATIONAL Ti-W PROMS

PROM TYPE	SIZE	DEVICE	CODE
DM74S188	32 x 8	C500	----
DM74S288	32 x 8	C500	----
DM74S287	256 X 4	D808	----
DM74S387	256 x 4	D808	----
DM74S570	512 x 4	D909	----
DM74S570A	512 x 4	D909	----
DM74S571	512 x 4	D909	----
DM74S571A	512 x 4	D909	----
DM74S571B	512 X 4	D909	----
DM74LS471	256 x 8	C828	----
DM74S472	512 x 8	C929	----
DM74S472A	512 x 8	C929	----
DM74S472B	512 X 8	C929	----
DM74S473	512 x 8	C929	----
DM74S473A	512 X 8	C929	----
DM74S474	512 x 8	C931	----
DM74S474A	512 X 8	C931	----
DM74S474B	512 X 8	C931	----
DM74S475	512 x 8	C931	----
DM74S475A	512 x 8	C931	----
DM87SR474	512 x 8	C939	C0B9
DM87SR474B	512 x 8	C939	C0B9

NATIONAL Ti-W PROMS cont'd

PROM TYPE	SIZE	DEVICE	CODE
DM87SR25	512 x 8	C939	CØB9
DM87SR25B	512 X 8	C939	CØB9
DM87SR476	512 x 8	C939	CØB9
DM87SR476B	512 x 8	C939	CØB9
DM74S572	1K x 4	DA1Ø	----
DM74S572A	1K x 4	DA1Ø	----
DM74S573	1K x 4	DA1Ø	----
DM74S573A	1K x 4	DA1Ø	----
DM74S573B	1K x 4	DA1Ø	----
DM87S18Ø	1k X 8	CA31	----
DM87LS181	1K x 8	CA31	----
DM87S181	1K x 8	CA31	----
DM87S181A	1K x 8	CA31	----
DM87SR181	1K x 8	CA39	CØB9
DM87S28Ø	1K x 8	CA31	----
DM87S281	1K x 8	CA31	----
DM87S281A	1K x 8	CA31	----
DM87S184	2K x 4	DB12	----
DM87S185	2K x 4	DB12	----
DM87S185A	2K x 4	DB12	----
DM87S185B	2K x 4	DB12	----
DM87S19Ø	2K x 8	CB3Ø	----
DM87S19ØA	2K x 8	CB3Ø	----
DM87S19ØB	2K x 8	CB3Ø	----

NATIONAL Ti-W PROMS cont'd

PROM TYPE	SIZE	DEVICE	CODE
DM87S191	2K x 8	CB3Ø	----
DM87S191A	2K x 8	CB3Ø	----
DM87S191B	2K x 8	CB3Ø	----
DM87S29Ø	2K x 8	CB3Ø	----
DM87S29ØA	2K x 8	CB3Ø	----
DM87S29ØB	2K x 8	CB3Ø	----
DM87S291	2K x 8	CB3Ø	-----
DM87S291A	2K x 8	CB3Ø	----
DM87S291B	2K x 8	CB3Ø	----
DM87S195A	4K x 4	DC2Ø	----
DM87S195B	4K x 4	DC2Ø	----
DM87S321	4K x 8	CC3Ø	----
DM87S321A	4k X 8	CC3Ø	----
DM87S421	4k X 8	CC3Ø	----
DM87S421A	4K x 8	CC3Ø	----

BIPOLAR MODULE MANUAL ADDENDUM

THE FOLLOWING CORRECTION SHOULD BE MADE TO THE BIPOLAR MANUAL DEVICE DICTIONARY.

TABLE 1.

TI 14/18 SERIES

PROM TYPE	SIZE	DEVICE CODE
TBP14S10	256 X 4	180C
TBP14SA10	256 X 4	180C

PLEASE ADD THIS PAGE TO THE BIPOLAR MANUAL TABLE 1.